

CLAIMS

What is claimed is:

1 1. A method comprising:
2 determining a state of a variable corresponding to a semaphore;
3 generating a semaphore entry for a thread of instructions prior to dispatch of the
4 thread for execution if the variable is in a first state; and
5 dispatching the thread of instructions for execution prior to generating the
6 semaphore entry for the thread if the variable is in a second state.

1 2. The method of claim 1 further comprising dispatching the thread of
2 instructions for execution and during the thread execution generating a semaphore entry
3 for the thread if the variable is in a third state.

1 3. The method of claim 1 wherein the variable corresponding to the
2 semaphore indicates whether a semaphore entity is to automatically transmit a message
3 indicating control of the semaphore to execution circuitry corresponding to the thread of
4 instructions.

1 4. The method of claim 1 wherein generating the semaphore entry for the
2 thread of instructions prior to dispatch of the thread of instructions if the variable is in the
3 first state comprises:

4 transmitting a message to a semaphore entity to request control of the semaphore
5 by the thread of instructions; and
6 dispatching the thread of instructions to execution circuitry in response to
7 receiving a signal indicating that the semaphore entity has processed the message.

1 5. The method of claim 4 wherein the transmitting the message to the
2 semaphore entity and dispatching the thread of instructions are pipelined.

1 6. The method of claim 4 wherein the message comprises a semaphore
2 identifier field, a thread identifier field, and a field corresponding to the variable.

1 7. The method of claim 1 wherein dispatching the thread of instructions for
2 execution prior to generating the semaphore entry for the thread if the variable is in a
3 second state comprises:

4 dispatching the thread of instructions to execution circuitry; and
5 transmitting a message to a semaphore entity to request control of the semaphore
6 by the thread of instructions in response to a signal indicating that execution of the thread
7 of instructions has commenced.

1 8. The method of claim 7 wherein the dispatching of the thread of
2 instructions and transmitting of the message to the semaphore entity are pipelined.

1 9. The method of claim 7 wherein the message comprises a semaphore
2 identifier field, a thread identifier field, and a field corresponding to the variable.

1 10. The method of claim 2 wherein dispatching the thread of instructions for
2 execution and during the thread execution generating the semaphore entry for the thread
3 if the variable is in a third state comprises:
4 dispatching the thread of instructions to execution circuitry; and
5 transmitting a message to a semaphore entity to request control of the semaphore
6 by the thread of instructions in response to the execution of a set of instructions.

1 11. The method of claim 10 wherein the set of instructions comprises an
2 acquire semaphore instruction.

1 12. The method of claim 10 wherein the set of instructions comprises an
2 acquire semaphore with auto-release instruction.

1 13. An apparatus comprising:
2 means for determining a state of a variable corresponding to a semaphore;
3 means for generating a semaphore entry for a thread of instructions prior to
4 dispatch of the thread for execution if the variable is in a first state; and
5 means for dispatching the thread of instructions for execution prior to generating
6 the semaphore entry for the thread if the variable is in a second state; and

7 dispatching the thread of instructions for execution and during the thread
8 execution generating a semaphore entry for the thread if the variable is in a third state.

1 14. The apparatus of claim 13 further comprising means for dispatching the
2 thread of instructions for execution and during the thread execution generating a
3 semaphore entry for the thread if the variable is in a third state.

1 15. The apparatus of claim 13 wherein the means for generating the
2 semaphore entry for the thread of instructions prior to dispatch of the thread of
3 instructions if the variable is in the first state further comprises:
4 means for transmitting a message to a semaphore entity to request control of the
5 semaphore by the thread of instructions; and
6 means for dispatching the thread of instructions to execution circuitry in response
7 to receiving a signal indicating that the semaphore entity has processed the message.

1 16. . . The apparatus of claim 13 wherein the means for dispatching the thread of
2 instructions for execution prior to generating the semaphore entry for the thread if the
3 variable is in a second state further comprises:
4 means for dispatching the thread of instructions to execution circuitry; and
5 means for transmitting a message to a semaphore entity to request control of the
6 semaphore by the thread of instructions in response to a signal indicating that execution
7 of the thread of instructions has commenced.

1 17. The apparatus of claim 14 wherein the means for dispatching the thread of
2 instructions for execution and during the thread execution generating the semaphore entry
3 for the thread if the variable is in a third state comprises:

4 means for dispatching the thread of instructions to execution circuitry; and
5 means for transmitting a message to a semaphore entity to request control of the
6 semaphore by the thread of instructions in response to the execution of a set of
7 instructions.

1 18. An apparatus comprising:

2 a semaphore entity to maintain entries for a semaphore indicating one or more
3 threads of instructions requesting control of the semaphore;
4 execution circuitry to execute one or more threads of instructions; and
5 a thread dispatcher coupled with the semaphore entity and the execution circuitry,
6 the thread dispatcher to determine a state of a variable corresponding to the semaphore,
7 generate a message to the semaphore entity to cause a semaphore entry for a thread of
8 instructions to be generated prior to dispatch of the thread of instructions to the execution
9 circuitry for execution if the variable is in a first state, and dispatch the thread of
10 instructions to the execution circuitry for execution prior to generating a message to the
11 semaphore entity to cause the semaphore entry for the thread to be generated if the
12 variable is in a second state.

1 19. The apparatus of claim 18 wherein the thread dispatcher further dispatches
2 the thread of instructions for execution and without generating a semaphore entry for the
3 thread if the variable is in a third state.

1 20. The apparatus of claim 18 wherein the semaphore entity maintains one or
2 more semaphores.

1 21. The apparatus of claim 18 wherein the message comprises a semaphore
2 identifier field, a thread identifier field, and a field corresponding to the variable.

1 22. The apparatus of claim 18 wherein the variable corresponding to the
2 semaphore indicates whether a semaphore entity is to automatically transmit a message
3 indicating control of the semaphore to execution circuitry corresponding to the thread of
4 instructions.

1 23. The apparatus of claim 18 wherein generating a message to the semaphore
2 entity to cause a semaphore entry for a thread of instructions to be generated prior to
3 dispatch of the thread of instructions to the execution circuitry for execution if the
4 variable is in a first state comprises transmitting a message to a semaphore entity to
5 request control of the semaphore by the thread of instructions, and dispatching the thread
6 of instructions to the execution circuitry in response to receiving a signal indicating that
7 the semaphore entity has processed the message.

1 24. The apparatus of claim 23 wherein the operations of transmitting the
2 message to the semaphore entity and dispatching the thread of instructions are pipelined.

1 25. The apparatus of claim 18 wherein dispatching the thread of instructions
2 to the execution circuitry for execution prior to generating a message to the semaphore
3 entity to cause the semaphore entry for the thread to be generated if the variable is in a
4 second state comprises dispatching the thread of instructions to execution circuitry, and
5 transmitting a message to a semaphore entity to request control of the semaphore by the
6 thread of instructions in response to a signal indicating that execution of the thread of
7 instructions has commenced.

1 26. The apparatus of claim 25 wherein the operations of transmitting the
2 message to the semaphore entity and dispatching the thread of instructions are pipelined.

1 27. The apparatus of claim 19 wherein the execution circuitry generates a
2 message to a semaphore entity to request control of the semaphore by the thread of
3 instructions in response to the execution of a set of instructions.

1 28. A system comprising:
2 a memory controller;
3 a semaphore entity to maintain entries for a semaphore indicating one or more
4 threads of instructions requesting control of the semaphore;

5 execution circuitry to execute one or more threads of instructions; and
6 a thread dispatcher coupled with the semaphore entity, the execution circuitry and
7 the memory controller to determine a state of a variable corresponding to the semaphore,
8 generate a message to the semaphore entity to cause a semaphore entry for a thread of
9 instructions to be generated prior to dispatch of the thread of instructions to the execution
10 circuitry for execution if the variable is in a first state, dispatch the thread of instructions
11 to the execution circuitry for execution prior to generating a message to the semaphore
12 entity to cause the semaphore entry for the thread to be generated if the variable is in a
13 second state, and dispatch the thread of instructions for execution and without generating
14 a semaphore entry for the thread if the variable is in a third state.

1 29. The system of claim 28 wherein the thread dispatcher further dispatches
2 the thread of instructions for execution and without generating a semaphore entry for the
3 thread if the variable is in a third state.

1 30. The system of claim 28 wherein the message comprises a semaphore
2 identifier field, a thread identifier field, and a field corresponding to the variable.

1 31. The system of claim 28 wherein the variable corresponding to the
2 semaphore indicates whether a semaphore entity is to automatically transmit a message
3 indicating control of the semaphore to execution circuitry corresponding to the thread of
4 instructions.

1 32. The system of claim 28 wherein generating a message to the semaphore
2 entity to cause a semaphore entry for a thread of instructions to be generated prior to
3 dispatch of the thread of instructions to the execution circuitry for execution if the
4 variable is in a first state comprises transmitting a message to a semaphore entity to
5 request control of the semaphore by the thread of instructions, and dispatching the thread
6 of instructions to the execution circuitry in response to receiving a signal indicating that
7 the semaphore entity has processed the message.

1 33. The system of claim 28 wherein dispatching the thread of instructions to
2 the execution circuitry for execution prior to generating a message to the semaphore
3 entity to cause the semaphore entry for the thread to be generated if the variable is in a
4 second state comprises dispatching the thread of instructions to execution circuitry, and
5 transmitting a message to a semaphore entity to request control of the semaphore by the
6 thread of instructions in response to a signal indicating that execution of the thread of
7 instructions has commenced.

1 34. The system of claim 28 wherein the operations of transmitting the
2 message to the semaphore entity and dispatching the thread of instructions are pipelined.